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Clinical Section

The Management of Stone in the Upper Urinary Tract*

By

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The formation of stone in the urinary tract constitutes one of the major problems of urinary surgery. Of its origin we are still uncertain and no known medication will definitely cause its solution. Historically, stone was recognized by the ancients many years B.C., and there is evidence to show that surgical procedures were devised for stone in the lower tract. Celsus is the earliest author to describe the operation of lithotomy when he refers to the methods used by the surgeons of Alexandria who had attained proficiency at this procedure. Hippocrates, in his oath binds his pupils not to perform this operation but to leave it to those who made it their business. It appears then, in his day lithotomy was a separate branch of the profession. Stone in the kidney, too, was recognized, but was not considered a surgical problem. For this they gave lithontriptics or agents which they considered capable of effecting solution of the calculus. The first operation for renal calculus was performed in 1633 by Dominico Marchetti.

The extent to which we have progressed since those days does not manifest itself by any material reduction in the incidence of this disease. The conditions which govern the formation of urinary calculi are still far from understood. This is attested to by the mass of literature theorizing upon the various concepts of origin. Yet, despite the obscurity of its cause, progress in the management of this disease cannot be denied. With advances in X-ray technique and cystoscopic methods investigation of this condition has become a very accurate study.

Urinary calculi do not show uniformity in composition. A stone of pure chemical composition does not occur but one with 90% of one salt is considered pure. Renal stones are predominantly oxalates or phosphates, whilst vesical calculi are predominantly uric acid or urates. The majority of stones are of mixed composition; thus there may be alternating layers of urates and oxalates with perhaps a deposit of phosphates on the surface. Calcium oxalate and uric acid calculi occur in an acid urine, are usually single and are associated with a minimal amount of infection. Phosphate calculi are often multiple, occur in an ammoniacal alkaline urine, and are usually associated with infection. Cystin calculi are of comparatively rare occurrence. They are due to an inborn error in metabolism whereby the liver allows an excess of cystin to escape conversion into urea. These calculi are associated with cystinuria and an acid urine and possess a strong tendency towards recurrence. Fibrin calculi are a rare variety. For these to develop a previous suppurative lesion must have existed, which, when associated with hematuria provides the necessary bacterial and chemical constituents.

GENERAL CONSIDERATIONS

I. *The dietetic factor.*

Vitamin A deficiency as a cause of urolithiasis has been championed by Higgens, of the Cleveland clinic, whose observations are based upon experimental work on albino rats. Rats sustained on a diet deficient in vitamin A developed phosphatic calculi in an alkaline urine and later showed evidence of urinary tract infection. Addition of vitamin A to the diet caused disintegration and solution of the calculi so produced. While rats are a species rather remote phylogenetically from man and it may be unreasonable to suppose that a similar condition should exist in humans, yet many interesting findings have been clarified by this discovery. Vesical calculus is much more common in children of India, Arabia and China where there is a lack of vitamin A in the diet, than in the so-called civilized countries where dietetic standards are much higher. In recognition of this principle, an Acid ash diet, high in vitamins, particularly vitamin A, is suggested as a prophylactic measure to prevent recurrence of calculi in those who have suffered the disease. Vitamin A is added in the form of cod liver or halibut liver oils.

It is difficult to say how much can be accomplished from dietary restrictions in calculi of the urinary tract; certainly, following the removal of a calculus it is important to advise the patient what foods to restrict, depending upon the composition of the calculus. Where oxalates predominate, foods rich in oxalic acid should be restricted. Examples of these are tobacco, cocoa, chocolate, tea and coffee, spinach, tomato, beet, celery and grapefruit. Foods containing only traces of oxalic acid are recommended. These are meat, rice, cauliflower, turnip, asparagus, butter, fats, onion, lettuce, peas, melon, mushroom, cream, egg and starches. Liberal amounts of milk should be taken to provide sufficient calcium to precipitate the oxalates and prevent their absorption.

Where urates predominate, the diet should be purin free. Responsible foods are the cellular organ meats such as sweetbreads, liver and kidney, also fish and fowl and certain vegetables. Caffein containing foods such as coffee, tea, and cocoa, are rich in purin and should also be avoided. The recommended diet is low in protein but contains an adequate amount of such foods as milk and

* Paper read at meeting of Winnipeg Medical Society, November 18th, 1938.

eggs; the carbohydrate content is high, while fats are within caloric limits.

The best dietetic prophylactic against formation of phosphates is the acid ash diet noted above.

II. *The infective factor and urinary PH.*

Stones have been divided into primary, and those secondary to infection. The primary stones are those with a tendency to an acid range and include urates, oxalates, and cystin calculi. Primary stones are held to be aseptic but this is not always true in clinical experience. Secondary stones composed of phosphates are precipitated in an alkaline urine, and are associated with urea-splitting organisms. Amongst these are various strains of staphlococcus, streptococcus, B. Coli, and Proteus Ammoniae. Normally the PH is subject to considerable variation depending upon the time of day, fluid intake, food, etc. The normal range is 5.0 to 7.5, with an average of 6.0. A constant high PH is not necessarily responsible for stone, as attested to by the fact that people who follow a long medicinal regime for peptic ulcer are not particularly susceptible to stone formation. In the management of calculi it is wise to shift the reaction of the urine to the opposite type from that responsible for stone formation. Haphazard prescribing without regard to this principle is not therapeutically rational. For example, in the case of cystin calculi, it is very important to render the urine alkaline by every means available.

An intensive effort to reduce infection to a minimum should be made. Repeated bacteriological studies of the urine are imperative. The vast majority of infections being associated with urinary alkalinity, hyperacidification is essential. Apart from dietetic measures previously discussed, drugs employed for this purpose are, ammonium chloride, ammonium nitrate, and sodium acid phosphate. Recent advances in the study of urinary infections has brought to the fore such drugs as sulfanilamide and mandelic acid. Strangely enough, sulfanilamide has given better results in bacillary than in coccal infections, whilst good results are never obtained in the case of streptococcus fecalis. Mandelic acid therapy has given satisfactory results in cases of B. Coli and streptococcus fecalis infections. Neoarsphenamine intravenously has been useful in many of the coccal infections.

III. *The water factor.*

Drinking water in many parts of the country contains more or less lime. Individuals from rural parts where well-water is drunk are inclined to blame all their ills upon this. The geographical distribution of stone indicates no relationship to water; where the drinking water contains much lime the incidence of stone is no greater. Istanbul, Turkey, possesses the purest and most healthful water in the world while its inhabitants are by no means exempt from calculi.

IV. *The Possibility of Dissolution of Calculi.*

In 1932 Randall of Philadelphia introduced phosphoric acid in the treatment of phosphatic incrustations and small fragments of phosphatic calculi left after operation. Interest has recently been revived in this work. Experiments on dogs have shown that solutions of phosphoric acid up to 5% have not caused any damage to the pelvic epithelial lining or the renal papillae. In man, bladder lavage with 1% solution and lavage of the renal pelvis with 3% solution is well tolerated. Phosphoric acid has a tendency to prevent alkalinization and phosphatic incrustation and is valuable in those cases of phosphatic calculi with a tendency to recurrence. There is no evidence to prove that it is capable of dissolving a calculus already formed.

V. *The Endocrine factor.*

Studies on the parathyroid bodies have served to show that renal lithiasis is in some way linked with disturbances in Calcium and Phosphorus metabolism. Increased production of parathyroid hormone gives rise to an increased level of serum calcium and a decreased level of serum phosphorus. Associated with this there is an increase in calcium and phosphorus in the urine. While hyperparathyroidism is responsible for between 4 and 5% of all cases of urinary stone, the percentage of stone in the presence of this disease is almost 70%. In about 38% of patients with hyperparathyroidism there is both bone and urinary tract disease. In the presence of stone no urological examination is complete without a careful study of the calcium and phosphorus content of the blood. After the removal of a parathyroid tumor stones do not recur.

SURGICAL CONSIDERATIONS

Which surgical procedure is best in the management of single or multiple stones in the kidney cannot be dogmatically stated. The choice of operation must be governed by the size of the stone, its position, the presence or absence of infection, the functional state of the affected kidney and the condition of the opposite kidney. Wherever possible, pelvi-lithotomy is preferable to nephrolithotomy. By this procedure kidney tissue remains intact, large blood vessels are not divided and satisfactory anatomic closure can be obtained. Where there has been infection and kidney function has suffered, pelvi-lithotomy combined with nephrostomy is advisable. The nephrostomy opening made through the lower pole involves minimal destruction of tissue, provides free drainage and enables intermittent introduction of medication calculated to dissolve incrustations and combat sepsis. It is a simple matter to remove a kidney for stone but the removal of all stones and stony fragments with preservation of the kidney requires many technical aids. Wherever possible the kidney should be saved, in the presence of extensive infection with excessive destruction of tissue, nephrectomy should be performed. A feeble elderly patient with non-obstructing renal calculi, minimal infection and

minimal symptoms should not be subjected to surgery. Cardiac lesions of the coronary type must be considered a contra-indication to surgery.

THE TREATMENT OF CERTAIN CLINICAL TYPES

(a) Silent Stones.

This type of calculus is non-obstructive but may be responsible for indefinite abdominal pain referable to other organs or may be symptomless, until brought to the surgeon's attention, perhaps by a profuse hematuria. Of this group, the only case in which procrastination is permissible is that of the small stone lying dormantly in the lower calyx. It is quite possible that once the stone is expelled into the pelvis it may be sufficiently small to pass on its own. If repeated X-rays show an appreciable increase in size, it should be removed.

(b) Multiple Calculi.

Cases in whom small calculi are frequently passed and where X-rays do not show a large single shadow are better treated non-surgically. Operation in such cases is followed by early recurrence. Those with larger calculi in whom operation is indicated constitute a difficult surgical problem. Very often nephrotomy is necessary with attendance of partial kidney destruction. A remaining fragment may be the nucleus for a new stone. In such cases nephrostomy drainage is useful and post-operative lavage with phosphoric acid should follow.

(c) Bilateral Renal Calculi.

From 8 to 20% of upper urinary calculi are bilateral. The therapeutic problems peculiar to bilateral calculi are not solved by application of stated formulas. Fundamental principles involved in a given case should govern therapeutic decisions. Among other data, it should be known whether or not the stones obstruct, the presence or absence of sepsis, the functional capacity of each kidney and the general condition of the patient. Not all cases of bilateral calculi should be operated upon; large non-infected, non-obstructive, symptomless stag horn calculi are better left alone. In the presence of acute infection a temporary nephrostomy may be performed prior to attacking the stone. There is questionable advantage in trying to remove a large mass of non-obstructing calculi occupying an entire kidney. It is almost impossible to find them all and the kidney is mutilated in the attempt. When surgery is decided upon in a given case, which side is to be done first? The knowledge possessed concerning the probable improvement in renal function will influence the surgeon. In other words, if an acute condition exists on one side, such as obstruction or infection, that side should be done first. Nephrectomy in the presence of bilateral renal calculi is a rare operation. If a circumstance presents itself where nephrectomy is required, the opposite kidney should be attacked first, relieved of its calculi and function fully restored.

(d) Ureteric Calculi.

The management of ureteric calculi is still a controversial point in urology. The expert urologist is disposed to remove the vast majority by trans-cystoscopic manipulation; the general surgeon favors operation; whilst a third group occupies a middle ground. Undoubtedly a large number of ureteral stones are passed by people who never see a physician. The following points should be considered in the management of any given case.

1. *Size and number of stones.*

If the stone is more than 1 cm. in diameter and it seems probable that more than three cystoscopic sittings will be necessary, it is better to proceed immediately with an extra-peritoneal ureterolithotomy. In the presence of more than one stone in the same ureter the largest is of primary importance. In the presence of a stone in each ureter the one causing the greatest degree of obstruction should be attacked first.

2. *Location of the stone.*

A stone in the lower third of the ureter is more amenable to manipulative treatment. A stone in the lumbar ureter is more easily dealt with by open operation. If the stone is 1 cm., or more in diameter, one should not hesitate to operate.

3. *Duration of symptoms.*

If the onset is recent, expectant treatment for several days is in order; the stone may pass during that interval. With a history of repeated attacks of colic it is better not to delay.

4. *Renal function.*

This can be indicated by either intravenous urography or cystoscopic observation of the ureteric orifices following the injection of dye. Poor function should influence one in the direction of open surgery.

5. *Intolerance to instrumentation* may be a deciding factor. In this respect females are much more tolerant than males.

6. *Infection.*

If acute and characterized by rigors and hyperpyrexia, open operation and drainage should be done at once.

It is difficult to set an arbitrary length of time during which a stone may be allowed to remain in the ureter. If several attempts at manipulation fail to dislodge the stone it is probably embedded in the ureteral wall and open operation is indicated. If infection ensues during the manipulative period, operation should be considered. At any rate one should not persist after a few sittings but be prepared to admit defeat and resort to open surgery.

Calculus Anuria.

This condition may occur under the following circumstances:

1. Both kidneys may be blocked simultaneously.

2. The blocking of a single secreting kidney.

3. There are two secreting kidneys; one becomes blocked and the other, because of a reno-renal reflex, fails to secrete.

The first step in treatment is to relieve the obstruction. Primarily, cystoscopic methods should be given a trial. If it is possible to insert a ureteral catheter past the point of obstruction, it is permitted to remain until recovery of kidney function; removal of the stone then becomes a safer procedure. Failure of this method calls for immediate operation. Ureterotomy or pyelotomy can be performed on one or both sides. If the stone is situated low down in the ureter and the condition of the patient poor it is advisable to perform a temporary nephrostomy as a life-saving measure.

POST-OPERATIVE TREATMENT OF UPPER URINARY CALCULI

The mere surgical removal of renal calculi no longer is sufficient. The early and late post-operative treatment constitutes one of the more important phases of management. This is particularly true where infection is present and where there is a tendency toward recurrence, a circumstance whose frequency has been variously estimated to occur in from 10 to 40% of cases. In general, treatment is carried out according to the principles outlined earlier in the paper.

The immediate treatment follows the same principles as for other surgical procedures. The forcing of fluids at first intravenously and later by mouth is essential for early resumption of kidney function.

To deal with infection a thorough bacteriological investigation is made and treatment instituted according to the organism found. In the presence of a nephrostomy tube, following about seven post-operative days one is justified in performing pelvic lavage, preferably with 2 to 3% phosphoric acid. Otherwise, pelvic lavage may be carried out through ureteral catheters at a later period.

The complete relief of all points of obstruction in the urinary tract should be sought after. Every effort should be made to provide free drainage and prevent stasis. For example, following a ureterolithotomy, intermittent dilatation of the ureter is essential. In the male it is essential to deal with obstruction of the lower tract such as the bladder neck and urethra.

The possible role played by foci of infection should not be overlooked and it is desirable to remove all such sources. Metabolic, dietetic, and endocrine principles have already been discussed.

A periodic urological examination following the operation for stone is important; particularly so if the patient has a tendency to persistent or recurrent infection or if he has impaired renal function or faulty drainage. Stones may be recognised when they are still small and infection combated before function is further impaired.

CONCLUSIONS

Stone in the upper tract constitutes a major urological problem.

To deal adequately with a given case the investigation must include not only the genito urinary tract but an accurate study of blood calcium and phosphorus.

Surgery constitutes only a phase in the treatment of calculus disease.

The general principles outlined in this paper comprise a resumé of recent work done on calculogenesis and have proved of value in prophylactic treatment.

Recent advances in the treatment of urinary infections have been of great assistance.

In any given case it is only by the application of sound urological principles, the institution of rational therapeutics measures and a proper follow-up, that one can hope to reduce the incidence of recurrence and achieve ultimate success.

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"In acute affections we concentrate upon the diseased organ, while in chronic affections we keep the general condition of the patient more in view."
—*Von Noorden.*

Special Articles and Association Notes

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An Abstract of the Manitoba Hospital Association's Presentation Before the Union of Manitoba Municipalities, December 7, 1938

An expenditure of three million dollars by one industry—more than half of it pay roll—that is big business.

A million days hospital treatment—a million days personal care—that is a major public service, not just another "social service."

This is equal to one in nine admitted each year to hospital or sanatorium or one and a half days treatment yearly for each man, woman and child in the Province.

That is what the hospitals in Manitoba represent and the service they give.

There are 41 hospitals and sanatoria listed in the Government Return.

18 made a profit—23 a loss. The 18 made a profit of $32,000.00—the 23 lost $388,000.00.

The inference is, if 18 can make a profit why cannot the others? Let us analyze further:

Of the 18 hospitals 16 of them averaged less than 25 occupied beds—8 of them less than 10 occupied beds.

All hospitals over 25 beds with two exceptions showed a loss.

All the hospitals in the "red" provided 900,000 days or nine-tenths of the service of the Province —the profit making hospitals supplied one-tenth of the service.

Again of the million days hospital treatment 946,000 or 88% were public and this is the real reason for losses. The municipal payment of $1.50 and the Government grant of 40c, in effect today, are together insufficient to pay for the hospital care which can and should be furnished in adequately staffed and equipped hospitals.

Examples given:

Cancer and Radiation Therapy.

Pneumonia—cost of care five years ago and now.

Motor accidents and the heavy immediate expense.

The Punch Operation for enlarged prostate, reducing the time, risk and disability, but increasing the expense to the hospital.

Distribution of the Hospital Service. Almost two-thirds of the general hospital beds are in the Winnipeg district. They have an occupancy of 72%. The general hospitals in the Province with slightly over one-third of the beds, have an occupancy of only 49%.

Medical Service—There still appears to be little appreciation of the amount of free medical service in hospital given by the physicians of this Province, a service which if paid for at ordinary rates would materially increase the cost of hospital care. Some day it may have to be paid for if the present inadequate allowances continue. In one hospital in which a study was made two-thirds of the medical service is furnished without remuneration to the doctor. It is the physicians' contribution for the care of those who otherwise could not obtain it.

It is not a case of City v Province. The Manitoba hospitals are on the best of terms with each other. Small rural hospitals would not be justified in employing high priced personnel and elaborate equipment which might be seldom used. The hospitals of Manitoba exist to look after the people of Manitoba — the residents of your Municipalities. The service must be given according to need not the patient's ability to pay—not sound economics in principle, but the only criterion that can be used in actual practice.

It is not alone a City of Winnipeg problem. Approximately 240,000 public days treatment are rendered yearly to patients from outside the City by the hospitals of Greater Winnipeg. This is to patients for whom your municipalities are responsible. This makes the problem of the City hospitals your problem and the problem of the whole Province.

The hospitals are not asking for preferred treatment but for consideration based on the cost of the service rendered.

The Manitoba Hospital Association will strongly support the principle of spreading the cost over the Judicial Districts or to be charged to consolidated revenue rather than the Muncipality. The total expense will not be greater, the distribution will be fairer, the hospitals should be better able to collect and the hospital and municipal relations will be infinitely more pleasant.

Minutes of Special Meeting of Winnipeg Executive

Minutes of a special meeting of the Winnipeg members of the Executive Committee of the Manitoba Medical Association was held on Thursday, December 15th, 1938, at 6.30 p.m. in the Medical Arts Club.

Present.

Members of Executive:

Dr. W. E. Campbell	Dr. Geo. Brock
(Vice-President,	Dr. S. G. Herbert
Chairman)	Dr. O. C. Trainor
Dr. C. B. Stewart	Dr. E. W. Stewart
Dr. O. J. Day	Dr. C. W. MacCharles.
Dr. C. E. Corrigan	

Chairman of Committee on Sociology: Dr. E. S. Moorhead.

Cornwallis-Health Unit.

The report from the Legislative Committee on letter from Dr. E. S. Bolton, Medical Officer for the Brandon-Cornwallis Health Unit, was read.

This report advised that a meeting of the Legislative Committee had been held on November 21st and that the following motion was passsed:

"Because of lack of information on the question under consideration, we recommend that this letter be referred to the Committee on Sociology of the Manitoba Medical Association, instructing them to confer with the physicians of Brandon and the Brandon Relief Officer in working out a satisfactory arrangement for the medical care of relief recipients."

It was moved by Dr. O. C. Trainor, seconded by Dr. C. B. Stewart: THAT this question be referred to the Committee on Sociology for consideration and report. —Carried.

Re. Letter from Dr. Routley re. Western Trip.

The secretary read a letter from Dr. Routley in which he stated that he expected to be in Winnipeg on January 17th and 18th, 1939. It was suggested that arrangements might be made for Dr. Routley to meet various Committees, and also that the full meeting of the Executive should be held either before the visit or at the time of his visit. The secretary was instructed to write Dr. Routley advising him that the Manitoba Medical Association would welcome his visit and arrange the necessary meetings, and notify him of his various appointments.

Letter from Secretary of C.M.A. re. Salaries to State Medical Officials.

The secretary read a letter from the secretary of the Canadian Medical Association dated November 18th, 1938, asking if the Canadian Medical Association should study the question of salaries paid to full time doctors in institutions and government services.

The question was raised by the chairman as to whether or not this would include salaries to municipal doctors.

Dr. Trainor pointed out that it was his understanding that it was not the intention of the Canadian Medical Association to extend the scope of this inquiry to include municipal doctors.

After considerable discussion, it was moved by Dr. O. J. Day, seconded by Dr. C. E. Corrigan: THAT the secretary be instructed to write Dr. Routley asking him if it was intended that this inquiry include the question of municipal doctors. —Carried.

Letter from Secretary of Honorary Attending Staff of St. Boniface Hospital.

A letter from the secretary of Honorary Attending Staff of St. Boniface Hospital was read in which the question of the legal responsibility regarding patients in hospital as it concerns the practitioner, the hospital and the internes was discussed.

It was moved by Dr. C. E. Corrigan, seconded by Dr. E. W. Stewart: THAT this letter be deferred until Dr. Routley's visit to Winnipeg, at which time he could be asked for recommendation as to the proper procedure to adopt with regard to this question. —Carried.

Letter from the Chairman of the Committee on Economics of the Canadian Medical Association.

The secretary read a letter from Dr. Wallace Wilson, Chairman of the Committee on Economics of the Canadian Medical Association, which had been addressed to Dr. Moorhead, the Manitoba member of this Committee. In his letter, Dr. Wilson stated that the resolution sent on to the Canadian Medical Association by the Manitoba Medical Association with regard to fees for reports to Insurance Companies had been referred to their Committee for study, and that an opinion from the other provinces was being obtained.

Medical Care for Unemployed on Relief.

The secretary read a letter from Dr. M. S. Lougheed, Assistant Medical Health Officer for Winnipeg, dated December 6th, in which he stated that he and Dr. Harvey wished to meet the representatives of the medical profession to discuss a new arrangement for caring for the unemployed on relief.

The chairman asked Dr. Moorhead for a report on the present status of the medical relief scheme. This was done.

The minutes of the meeting of the panel practitioners held on September 9th, 1938, were referred to and the resolutions read.

There followed a general discussion with regard to this problem.

It was moved by Dr. O. C. Trainor, seconded by Dr. C. B. Stewart: THAT the Committee on Sociology be advised that the Executive Committee see no reason for departing from the original principle of the contract with the City Council for the care of unemployed on relief.

It was moved by Dr. Geo. Brock, seconded by Dr. O. C. Trainor: THAT the Committee on Sociology be instructed to carry out the wishes of the general meeting of the panel practitioners held on September 9th, 1938, but in so doing they are to be limited by their responsibility as a Committee of the Manitoba Medical Association. —Carried.

The question of the Chairman of the Committee on Sociology making a report to the meeting of the Winnipeg Medical Society on December 16th was discussed.

It was moved by Dr. O. C. Trainor, seconded by Dr. Geo. Brock: THAT the Committee on Sociology be instructed to represent the Manitoba Medical Association in negotiations with Drs. Lougheed and Harvey, as requested in Dr. Lougheed's letter, and that Dr. Lougheed be notified to this effect by the secretary. —Carried.

The meeting then adjourned.

Secretary of Canadian Medical Association To Visit Manitoba

Plans have been made by Dr. T. C. Routley, General Secretary of the Canadian Medical Association, to visit the Provincial Medical Associations of Western Canada during January.

A meeting of the Executive Committee of the Manitoba Medical Association will be held during his visit on January 17th, and in addition there will be meetings with various special committees.

Membership in the Manitoba Medical Association

The membership year of the Manitoba Medical Association starts on January 1st. The year that is just past was one of the most successful in the history of the Association. The membership was the largest yet attained, and the registration at the Annual Meeting in September was the largest on record. These are indications of the part which this organization is playing in the work of the medical profession in Manitoba.

The voluntary medical organization of the province is based on the District Medical Societies, such as the North Western and the Winnipeg Medical Societies. These are joined together in the provincial organization of the Manitoba Medical Association. This association is again linked with the other provinces of Canada as a branch of the Canadian Medical Association. In this way the chain of contact goes forward from the small local society to the national body. Each of these organizations plays its part in the life and work of the profession. The Canadian Medical Association is also affiliated with the British Medical Association whose branches extend throughout the remainder of the Empire.

The work of the voluntary medical organizations has become increasingly important in recent years. There are a growing number of problems which require co-operation or negotiation between representatives of the medical profession and other social groups including various governments. As the past president, Dr. C. W. Burns, pointed out so clearly in his presidential address in September, the work of the Executive Committee of the Manitoba Medical Association has extended far beyond that of providing a scientific programme and social events for an Annual Meeting. A multitude of medico-sociological problems are presented to the executive throughout the year. Some of these problems such as the Unemployment Relief Medical Service in Winnipeg, require frequent consideration.

State Health Insurance is a problem which is more and more requiring the study and attention of the medical profession. The profession may be required to express some opinion on this problem before long. The Manitoba Medical Association has kept in touch with developments in this field and the Committee on Sociology has been making a study of the problem. Your opinion on this as on other such questions can be effectively expressed only through the organized medical societies. It is futile for a practitioner to stand aloof from an organization such as the Manitoba Medical Association and then complain that this organization does not truly represent the opinion of the medical profession.

The various Standing and Special Committees hold frequent meetings throughout the year. The chairmen of these committees are members of the similar committees of the Canadian Medical Association and in this way a close liason with the national body is maintained. Various subjects are referred to these committees for study and report. A brief perusal of the reports presented at the Annual Meeting in September will show the amount of work carried out by the members of these committees.

One of the important functions of the Manitoba Medical Association is to provide speakers for the meetings of the District Societies throughout the year. This work is invaluable in making for an exchange of information throughout the profession and aiding the diffusion of recently accumulated knowledge.

The Manitoba Medical Association *Review* is sent to every practitioner in Manitoba, and in addition to recording the work of the Association and carrying the official news items from the Department of Health, publishes short clinical articles of topical interest.

Arrangements for the next Annual Meeting of the Association next September are already under way, and it is hoped that it will again be possible to have guest speakers from outside Manitoba.

The Executive Committee trust that all old members and a great many new members will join the Manitoba Medical Association in January. The Manitoba Medical Association is your organization and can function effectively only if it has the active membership of the great majority of medical practitioners throughout the province.

OBITUARY

Dr. Samuel Alexander McKeague

Dr. Samuel Alexander McKeague died at his home in Winnipeg on December 9th. Born at Wellandport, Ont., in 1858, he graduated from Trinity Medical College, Toronto, in 1884, and later obtained the L.R.C.S. & P. degree from Edinburgh. For some years he practised at Wellandport and Acton, then came to Winnipeg in 1904 where he secured a large practice. On his retirement in 1928 he was made an honorary member of the Manitoba Medical Association. He is survived by his widow, daughter of Hon. David Henderson, Acton; three sons and two daughters. He will be remembered for his kindliness. One of the sons is Dr. David Henderson McKeague, a Manitoba graduate, now practising at Maddock, North Dakota.

"Never give a definite opinion as to how long a patient suffering from pulmonary tuberculosis will live, for the only certainty is that if you do, you will be wrong."—*Samuel Gee.*

Vitamin Needs in Pregnancy

In may ways pregnancy is a great drain upon a woman's system and it is necessary that she receive a diet adequate in vitamin and mineral content.

Vitamin A is important in strengthening the resistance of the epithelial membrane to infection.

Vitamin D is important in its role as the regulator of calcium metabolism. If the diet is lacking in Vitamin D, calcium will not be assimilated.

Vitamin E has an important effect upon the reproductive glands. The work of Watson, Shute and others has shown that lack of Vitamin E is one of the prime causes of habitual abortion.

Calcium Phosphate is essential if the pregnant woman is to have sufficient calcium to supply the needs of the developing foetus.

Calhalol-E Capsules (Horner) contain Halibut Liver Oil Fortified, Wheat Germ Oil and Calcium Phosphate. Dosage with Calhalol-E ensures that the mineral requirements of the pregnant woman are adequately taken care of. There will be no drain on the mineral content of her body and nausea and pruritus will generally be conspicuous by their absence.

Calhalol-E should be given to every expectant mother, irrespective of any other condition arising during the period of gestation. —Advt.

B.D.H. Sex Hormones

The manufacture of the Female Sex Hormones in a crystalline form and the supply of accurately standardised preparations for clinical use have led to the development of an exact technique of application in the majority of conditions associated with ovarian dysfunction.

In the belief that it will be of interest a booklet of sixty-four pages has been prepared dealing with the employment of B.D.H. Sex Hormones in gynaecological and abnormal obstetric conditions of endocrine origin. The booklet is esssentially clinical in outlook; it deals with the established method of administration of the hormones in these very important indications.

—Advt.

Department of Health and Public Welfare

NEWS ITEMS

THE PREVENTIVE ASPECTS OF VITAMIN DEFICIENCY DISEASES IN INFANCY AND EARLY CHILDHOOD

David H. Shelling

"Twenty-five years ago, the subject of avitaminosis was practically unknown to physicians; but today lay persons are more vitamin conscious than their physicians. This vitamin-consciousness is due largely to the campaign waged by modern medicine in preventing deficiency diseases, and, in part, to advertisements which constantly remind the laity that failure to partake of foods containing vitamins may lead to illness.

"The prevention of vitamin-deficiency diseases is less of a problem in the adult than in the infant and growing child. This is due to the fact that the average adult eats a mixed balanced diet containing "natural" food substances which are usually adequate in all the known vitamins. The infant or the young child, on the other hand, has to depend on food substances which are not always 'optimal' in their vitamin contents. Milk, the chief article of food in the infant's diet, contains a fair amount of vitamin A but is poor in vitamins B_1, C, and D. Other food substances, introduced during infancy, may likewise be deficient in one or more of the vitamins. It is, therefore, important to supplement the diet of the infant and young child with the necessary vitamins, either in the form of natural foods or commercial preparations. Since mild degrees of vitamin deficiencies are difficult to detect and may manifest themselves as remote complications, it is important that vitamins be administered in 'optimal' rather than in 'minimal' amounts, when these amounts can be ascertained.

"The deficiency diseases encountered during infancy and early childhood are chiefly those resulting from a paucity in the intake of vitamins A, B, C and D.

VITAMIN A

"The best known clinical syndrome of vitamin A deficiency is xerophthalmia or keratomalacia. Fortunately, this form of avitaminosis is unknown in the United States, since nearly all infants and children consume daily a fairly optimal amount of vitamin A in their milk. Milder degrees of vitamin A deficiency, however, do occur and these are evident in their effect on epithelial tissues in the form of (a) keratinization of the skin into a hard papular lesion about the extensor surfaces of the forearms, legs and thighs; (b) urinary tract infections with calculus formation; (c) and infections of the respiratory passages. The latter changes, as well as the thickening of the epithelial layers of the gastrointestinal tract, have been noted in experimental animals and in young infants in whom the intake of vitamin A was deficient or the vitamin was not absorbed in appreciable amounts as a result of a protracted diarrhea or of celiac disease. These inflammatory changes in the tissues in hypovitaminosis A are, in reality, secondary to the keratinization of the epithelial linings, and the only known function of vitamin A is to maintain a normal epithelium which will act as a barrier to infection. Such a function, however, is not sufficient to designate it the 'anti-infective' vitamin. Furthermore, it has not been proved conclusively that excessive amounts of vitamin A will increase resistance to infection, nor has it been established that the vitamin has any influence on immunological reactions in the body.

"Night blindness, or the inability to see clearly in dusky light, as a manifestation of vitamin A deficiency, has not been observed to any great extent among American children. Jeans and Zentmire, however, found that a large percentage of school children in Iowa had abnormal vision in the dark, which they believe to be due to vitamin A deficiency and which they claimed to have been benefited by cod liver oil.

"Deficiency of vitamin A in normal infants is prevented by an adequate intake of milk rich in butter fat and by supplements of either carotene, or of the liver oils of the cod, halibut, burbot, tuna, or of the fish of the percomorph group. In older children, the deficiency may be prevented by the inclusion in diet of butter, cream, carrots, spinach, eggs, and the fish oils just mentioned. The exact daily requirement of vitamin A for infants or children is not known but is estimated to be between 4,000 and 10,000 U.S.P. units daily.

"In infants with protracted diarrhea or in children with celiac disease, a large percentage of the vitamin A ingested is apt to be lost in the stools. Under such circumstances, much larger doses of vitamin A should be administered in order to assure an adequate retention. In rare instances, a concentrate or an emulsion of the vitamin may be injected intramuscularly.

"Recent studies in animals indicate that large amounts of vitamin A may be lost in the feces as a result of purgation with mineral oil and that this loss may be averted, at least in part, by an abundant supply of vitamin B. Consequently, the indiscriminate use of mineral oil as a laxative should be discouraged.

VITAMIN B

"Since the original discovery that beriberi or multiple neuritis was caused by a paucity of vitamin B in the diet, several other fractions of the vitamin have been isolated, each having a specific effect on the body physiology. The two principal fractions of pediatric interest are B_1 and B_2 (G), although actually, manifestations of a deficiency of either of these fractions occur but rarely in infants and children of this country. This is due to the fact that such infants and children receive protective amounts of these vitamins in their food. However, in cases of prolonged diarrhea or vomiting, vitamin B deficiency should be suspected and therapy instituted, in spite of the difficulty of establishing the diagnosis.

"The cardinal clinical feature of vitamin B_1 deficiency in adults is beriberi with its triad of symptoms of edema, peripheral neuritis, and cardiac failure. The diagnosis is fairly simple in well advanced cases but extremely difficult in states of partial deficiency. In children, the diagnosis is even more difficult, for the symptoms may resemble a variety of diseases referable to the cardiac, nervous and gastrointestinal systems, which may or may not be associated with vitamin B_1 deficiency. However, if the child is breast fed and there is reason to believe that the mother's diet is deficient in vitamin B_1, both the mother and the child should receive supplements of this vitamin.

"Pellagra, the disease caused by a deficiency in vitamin B_2 (also known as vitamin G, the anti-dermatitis vitamin or the P-P factor), is a rare occurrence in infants and young children, except in pellagra district. Thus, it occurs in breast fed babies whose mothers are pellagrins.

"In experimental animals, a lack of vitamin B in the diet leads to anorexia. Whether or not anorexia in apparently normal children is due to such a deficiency has not been definitely established, although it must be admitted that in some children the anorexia may be overcome by the administration of substances containing large amounts of vitamin B.

"Prematurely-born infants are more susceptible to rickets than are full-term babies. This may be due to the rapidity of skeletal growth, to the requirement for phosphorous in building rapidly-growing soft tissue, and possibly also to the inability of the premature to utilize calcium phosphate in seemingly optimal amounts, unless larger doses of vitamin D are given. Since the concentration of vitamin D in average cod liver oil is limited, it is best to feed such infants substances containing the vitamin in more concentrated amounts, i.e., viosterol, halibut liver oil, percomorph oil, and irradiated ergosterol in propylene glycol. The average daily dose of the oily preparations is about 3,000 to 4,000 units and the average daily dose of irradiated ergosterol in propylene glycol, dissolved in milk is about 1000 units. These may be started in the first week of life and the dosage continued until the baby reaches a fairly normal weight, when it may be reduced to the levels recommended for full-term infants.

"Children with celiac disease may lose ingested calcium in the form of soaps and fat soluble vitamins in their fatty, bulky stools. For this reason, larger amounts of vitamin D must be given to assure an adequate retention and to prevent the loss of calcium, if possible. As most clinical observers believe that fat should be restricted in the diets of patients suffering from this disease, cod liver oil with its large bulk of fat is not a suitable source of vitamin D. Viosterol, cod liver oil concentrates, fish liver oils fortified with irradiated ergosterol, or irradiated ergosterol in propylene glycol are preferable. The dose is the same as prescribed for prematurely-born babies."

"Vitamin B and its various fractions occur in abundance in fresh vegetables and in Brewer's yeast. It may also be obtained from wheat germ or its oil. The antipellagra factor is also found in milk, glandular tissue, fish and meat. For the prevention of vitamin B deficiency in the average normal child, a well balanced diet, containing milk, vegetables and meat, is sufficient. For children with chronic diarrhea or for those who do not tolerate vegetables, vitamin B may be supplied in the form of powdered yeast, yeast tablets, yeast extracts, or as malt.

VITAMIN C

"A deficiency in vitamin C results in scurvy. The disease is much more common in infants than is generally suspected. This is especially true among infants of poor families. While such families are usually aware of the need of cod liver oil as an antirachitic agent and thus manage to receive it from one charitable organization or another, they fail to provide the infant with foods containing vitamin C, with the result that many such infants and even children suffer from either manifest or sub-clinical scurvy. The former is easily diagnosed, but the latter may be readily overlooked. It may be responsible for poor dentition, hemmorhagic tendencies, and even for anemia not due to a lack of iron.

"Scurvy may be easily prevented in infants by adding citrous juices to their diets and in young children by the inclusion in the diets of citrous fruits and of vegetables. In infants, orange juice has been used most extensively as an antiscorbutic, but the juices of other citrous fruits such as lemon, lime or grapefruit are equally as good. The usual daily preventive doses for infants is the juice of at least one orange. Tomato juice, freshly pressed or canned, is also a good source of vitamin C, but the amount necessary to prevent scurvy is usually twice that of orange juice. Families who cannot afford to buy citrous fruits may obtain a fair supply of vitamin C from the juice of raw cabbage or raw potatoes, but such a source is seldom resorted to either because of an aversion to such juices or because of ignorance of the fact that these simple vegetables contain vitamin C.

"Pure vitamin C, or cevitamic acid, is now obtainable on the market in solution and as coated pills. The pills may be added to a portion of the daily milk formula and thus provide an adequate source of vitamin C. Milk enriched with cevitamic acid should not be allowed to stand more than a few hours, as the vitamin potency may thus be reduced.

VITAMIN D

"A deficiency in vitamin D results in rickets. Until very recently, rickets was a most prevalent disease in Europe and in America. It exacted its toll not so much in death as in deformities of the extremities, chest and pelvis. With the advancement of knowledge concerning the nature of vitamin D and its popularization by physicians and public health agencies, the incidence of rickets has waned considerably. Even among Negro children, the most susceptible to this disease, both the incidence and severity have diminished, so that one may find it difficult to find in New York City a sufficient number of babies with active rickets to study the curative effects of vitamin D preparations.

"Vitamin D and the parathyroid glands regulate not only the deposition of lime salts in the skeleton but also the levels of calcium and inorganic phosphorus in the serum. A deficiency in either vitamin D or in the secretion of the parathyroids may result in a lowered concentration of calcium in the serum, ultimately leading to tetany. Thus a deficiency in vitamin D may produce either rickets alone or both rickets and tetany. It is important to realize that tetany is a serious symptom and that it may occur not only in infants entirely deprived of vitamin D but also in babies receiving inadequate amounts, in which cases the rickets is mild or is in a state of partial healing. Therefore, in prescribing vitamin D, the dosage should be sufficient to prevent completely both rickets and tetany.

"Rickets can be prevented in infants by the regular admininistration of about 1200 U.S.P. units of vitamin D in the form of cod liver oil, halibut liver oil, percomorph oil, tuna liver oil, or viosterol. This number of units is usually contained in three teaspoonfuls of average cod liver oil or in five drops of viosterol (10,000 U.S.P. units per gram). The dosages of the other fish liver oils and the various modifications with viosterol depend upon the number of rat units they contain per gram. The dosage of such preparations may be ascertained as follows: One gram of oil contains X number of units; each gram of oil contains approximately 40 drops, and 4 grams or cubic centimeters of oil make one teaspoonful. Divide X by 40 to obtain the number of units per drop and then divide the number of units desired to administer by this number to obtain the number of drops, cubic centimeters, or teaspoonfuls.

"Vitamin D may be administered indirectly in milk, cereals and bread. Some of these foods on the market are made antirachitic by irradiation with carbon or mercury quartz lamps; others are made so by the addition of viosterol or of the concentrates of fish liver oils. The antirachitic value of bread and of cereals to the very young infant is probably negligible, since the number of rat units of vitamin so acquired is usually quite small. Vitamin D milk, however, offers an excellent vehicle for the universal distribution of vitamin D, for all babies drink milk. The irradiated milks, however, are not to be entirely relied upon to protect against rickets, since the number of rat units which can be imparted to milk by irradiation is just below the minimum requirement for complete protection. However, milk rendered antirachitic by the addition of viosterol or of cod liver oil concentrates are much safer, for they contain a larger number of units per quart than irradiated milk, usually 400 U.S.P. as against 135 units in irradiated milk. The efficacy of this lesser number of units of vitamin D in milk as compared to cod liver oil or viosterol (1200 units), fed separately, is probably due to the fact that, in milk, the vitamin is homogenized or finely dispersed in the small fat globules and is probably thus more

easily absorbed from the gastrointestinal canal.

"In this connection, is must be remembered that the mere addition of viosterol in oil, or a few drops of other potent vitamin D preparations in oil to the milk formula will not render the milk antirachitic, since the oil merely floats and sticks to the sides and the infant usually receives little or none of the vitamin D. It is necessary that the oil be homogenized in the milk mechanically as is done in commercial processes. Recently, irradiated ergosterol was introduced on the market in a non-oily vehicle which is miscible with milk and other aqueous solutions. The vehicle is propylene glycol. It is tasteless, odorless, and apparently non-toxic; and probably because it disperses the vitamin D in the fat globules of the milk, its antirachitic activity approaches that of vitamin D milk, i.e., it requires only 400 U.S.P. units to protect against rickets.

COMMUNICABLE DISEASES REPORTED

Urban and Rural — November, 1938

Occurring in the Municipalities of:

Scarlet Fever: Total 260—Winnipeg 108, Portage Rural 18, Morton 17, Rosser 10, Woodworth 9, Springfield 9, Brenda 7, Daly 7, Portage City 7, St. Andrews 6, St. Boniface 6, Kildonan East 5, Brooklands 4, Franklin 4, Kildonan West 4, Unorganized 4, Brandon 3, Charleswood 3, Flin Flon 3, Siglunes 3, Transcona 3, Hillsburg 2, Ochre River 2, Argyle 1, Dauphin Rural 1, Fort Garry 1, Glenwood 1, Killarney 1, Lorne 1, Louise 1, Selkirk 1, Shellriver 1, Souris 1, Swan River Rural 1, St. Vital 1, Turtle Mountain 1, Tuxedo 1, Woodlands 1 (Late Reported: October, St. Boniface 1).

Chickenpox: Total 203—Winnipeg 79, Dauphin Town 17, St. Vital 14, Roblin Rural 13, Unorganized 13, Dauphin Rural 11, Selkirk 11, St. Andrews 11, Kildonan West 8, St. James 7, St. Boniface 5, Brandon 3, Pipestone 4, Binscarth 1, Cypress North 1, Hamiota Village 1, Portage Rural 1, Stonewall 1, Whitehead 1 (Late Reported: October, St. Boniface 1).

Measles: Total 128—Turtle Mountain 27, Winnipeg 16, Argyle 14, Roblin Rural 14, Lorne 13, Springfield 11, Cypress South 6, Cartier 3, Rosser 3, Arthur 1, Fort Garry 1, Franklin 1, Killarney 1, Louise 1, Oakland 1, Riverside 1, Strathcona 1, Wawanesa 1 (Late Reported: October, Cypress South 11, Bifrost 1).

Mumps: Total 94—Winnipeg 70, Brandon 6, Kildonan East 6, Unorganized 5, Tuxedo 2, St. James 2, Argyle 1, Kildonan West 1, Virden 1.

Whooping Cough: Total 74—Winnipeg 25, Unorganized 8, Kildonan East 7, Arthur 6, Brandon 6, Hanover 5, Daly 4, Lawrence 4, Stonewall 2, Killarney 1, St. James 1, Woodworth 1 (Late Reported: October, St. Andrews 1, St. Boniface 1, Unorganized 2).

Diphtheria: Total 64—Flin Flon 21, Winnipeg 14, Hanover 11, Unorganized 11, Brandon 2, Westbourne 2, Kildonan West 1, Selkirk 1, St. Andrews 1.

Diphtheria Carriers: Total 17—Flin Flon 9, Winnipeg 3, Unorganized 2, Hanover 1, Rosser 1 (Late Reported: October, Selkirk 1).

Anterior Poliomyelitis: Total 16—Franklin 2, St. Boniface 2, Unorganized 2, Coldwell 1, De Salaberry 1, Miniota 1, Rhineland 1, St. Andrews 1, St. Laurent 1, Thompson 1 (Late Reported: August, St. James 1; October, Dauphin Rural 1, Gimli Rural 1).

Tuberculosis: Total 16—Winnipeg 15, Brandon 1.

Typhoid Fever: Total 12—Unorganized 4, Hanover 2, Binscarth 1, De Salaberry 1, Franklin 1, Kildonan East 1, St. Boniface 1 (Late Reported, September, Hanover 1).

Influenza: Total 10—Ellice 1, Winnipeg 1 (Late Reported: September, Hanover 1, Norfolk North 1, Portage City 1; October, Cypress South 1, St. Anne 1, St. Boniface 1, Unorganized 1, Virden 1).

Septic Sore Throat: Total 8—The Pas 4, Daly 2, Brooklands 1, Flin Flon 1.

Erysipelas: Total 8—Winnipeg 4, Argyle 1, St. Boniface 1, St. James 1, Transcona 1.

Trachoma: Total 2—Hanover 2.

Epidemic Jaundice: Total 2—Lorne 2.

Cerebrospinal Meningitis: Total 1—St. James 1.

Ophthalmia Neonatorum: Total 1 (Late Reported: April, Daly 1).

German Measles: Total 1—Kildonan West 1.

Venereal Disease: Total 180—Gonorrhoea 108, Syphilis 72.

DEATHS FROM ALL CAUSES IN MANITOBA

For the Month of October, 1938

URBAN—Cancer 55, Pneumonia 14, Tuberculosis 5, Infantile paralysis 3, Syphilis 3, Influenza 2, Typhoid fever 2, Lenthargic Encephalitis 1, Septic Throat 1, all others under one year 14, all other causes 174, Stillbirths 13. Total 287.

RURAL—Cancer 29, Tuberculosis 10, Pneumonia 9, Influenza 5, Whooping Cough 3, Diphtheria 2, Dysentery (not specified) 1, Scarlet fever 1, all others under one year 43, all other causes 157, Stillbirths 20. Total 280.

INDIANS—Tuberculosis 10, Whooping Cough 4, Pneumonia 2, Dysentery (not specified) 1, all others under one year 1, all other causes 2, Stillbirths 1. Total 21.

NOTICE

To: ALL THE PRACTISING PROFESSION

PLEASE NOTE:

THAT ORDERS for BIOLOGICS and ENQUIRIES for the DIVISION of DISEASE PREVENTION should be directed to the NEW HOME of the Branch Offices of the DEPARTMENT OF HEALTH AND PUBLIC WELFARE at 320 SHERBROOK STREET, Winnipeg, Telephone 37 131 after January 1st, 1939.